

## **Remarks**

### **Drawing Amendments:**

Figure 3A has been modified to indicate the region for the first and second pair of coplanar, parallel transmission paths 174 to 180, as well as, for the third and fourth pair of coplanar, parallel transmission paths 182 to 188.

Figures 4A and 4B have been added. These Figures indicate the disk drive including the disk drive read and write interfaces, with the head arms providing a ground plane for the pairs of coplanar, parallel transmission paths interconnecting the read and write interfaces to head sliders by read and write differential wire pairs.

### **Discussion of Cited Prior Art**

As stated above regarding **forming a ground plane of the metallic body of the head arm, and its relationship to the cited prior art.** The cited prior art, while pointing to flexures, which were relevant, did not point to using the metallic body of the head arm as a ground plane, as discussed in the patent application. Young (US 5,717,547) discloses multi-track transmission lines, which in some cases, is given a ground plane as part of the flex circuitry over what is generally called the load beam, and in this application, the head/slider unit. Similarly, Klaassen (US 5,608,591) discloses one or more ground planes again located in the flex cable.

**Conclusion**

The Applicant believes that this response addresses every issue and rejection raised by the most recent office action. The Applicant respectfully requests the Examiner to withdraw all objections and rejections to the pending Claims and that the pending Claims be allowed.

If there are further issues the Examiner wishes to discuss, please contact either Earle Jennings or Gregory Smith at (510) 742-7417.

Respectfully,



Earle Jennings

Registered Patent Agent, 44,804

## **Amendments**

### **Amendments to the Figures:**

Figure **3A** has been amended by red ink to indicate a first and a second pair of coplanar, parallel transmission paths **174-178** essentially parallel to the ground plane. The head arm **150** may further include a first and a second pair of coplanar, parallel transmission paths **174-178** essentially parallel to the ground plane.

Figures **4A** and **4B** have been added to illustrate disk drive **10** include voice coil actuator arm **30** including at least one head arm **150** providing at ground plane for a first and a second pair of coplanar, parallel transmission paths **174-178** essentially parallel to the ground plane. The head arm **150** may further include a third and a fourth pair of coplanar, parallel transmission paths **184-188** essentially parallel to the ground plane.

**Claims Amendments: Version with Markings to Show Changes Made.**

1. (amended) A voice coil actuator arm comprising:

a head arm collection including a first head arm, a second head arm and a third head arm;

wherein each ~~member of~~ said head arms of said head arm collection is comprised of:

at least one ground plane formed in said head arm ~~collection member~~; and

a first and a second pair of coplanar, parallel transmission paths essentially parallel to said ground plane interconnecting both a read differential wire pair and a write differential wire pair to a head slider, respectively;

said first parallel transmission path pair interconnects to a disk drive read interface; and

said second parallel transmission path pair interconnects to a disk drive write interface.

3. (Amended) The apparatus of Claim 1, further comprising:

an analog interface interconnecting said first parallel transmission path and said disk read interface, for at least one of said head arm ~~collection members~~; and

said analog interface interconnecting said second parallel transmission path and said disk write interface, for at least one of said head arm ~~collection members~~.

4. (Amended) The apparatus of Claim 1, further comprising:

an analog interface interconnecting said first parallel transmission path and said disk read interface, for each of said head arm ~~collection members~~; and

said analog interface interconnecting said second parallel transmission path and said disk write interface, for each of said head arm ~~collection members~~.

9. (Amended) The method of Claim 8,

wherein said voice coil actuator arm is further comprised of a second head arm; and

said method is further comprised of the steps of:

said second head arm providing electrical interconnection between a third head slider and a third disk drive read interface and a third disk drive write interface ~~as in Claim 6.~~

10. (Amended) The method of Claim 9,

wherein said voice coil actuator arm is further comprised of a third head arm; and  
said method is further comprised of the steps of:

said third head arm providing electrical interconnection between a fourth head slider and a fourth disk drive read interface and a fourth disk drive write interface ~~as in Claim 6.~~

17. (Amended) The apparatus of Claim 16, further comprising:

a second head arm ~~as in Claim 15~~ interconnecting a third head slider, a third disk read interface and a third disk write interface.

18. (Amended) The apparatus of Claim 17, further comprising:

a third head arm ~~as in Claim 15~~ interconnecting a fourth head slider, a fourth disk read interface and a fourth disk write interface.

25. (Amended) The method of Claim 24,

~~wherein said head arm is a product of the process of Claim 2222,~~ further comprising the steps of:

providing a third differential signal path and a fourth differential signal path as essentially parallel, coplanar traces on said head arm traversing an essentially fixed distance parallel to said ground plane as a third differential trace pair and a fourth differential trace pair;

providing connectivity to a second head slider for a second read differential wire pair and for a second write differential wire pair via said third and said fourth differential trace pair, respectively;

providing connection to a second disk drive read interface via said third differential trace pair; and

providing connection to a second disk drive write interface via said fourth differential trace pair.

26. (Amended) The method of Claim ~~25~~,22,

wherein ~~said~~ voice coil actuator arm is ~~further~~ comprised of said head arm and a second head arm; and

said method is further comprised of the steps of:

manufacturing said second head arm to provide electrical interconnection between a third head slider and a third disk drive read interface and a third disk drive write interface ~~as in Claim 23~~.

27. (Amended) The method of Claim 26,

wherein said voice coil actuator arm is further comprised of a third head arm; and

said method is further comprised of the steps of:

manufacturing said third head arm to provide electrical interconnection between a fourth head slider and a fourth disk drive read interface and a fourth disk drive write interface ~~as in Claim 23~~.

31. (New) Said voice coil actuator arm including said head arm, as a product of the process of Claim 24.

**Amendments to the Claims (unmarked up version):**

1. (amended) A voice coil actuator arm comprising:

a head arm collection including a first head arm, a second head arm and a third head arm;

wherein each of said head arms of said head arm collection is comprised of:

at least one ground plane formed in said head arm; and

a first and a second pair of coplanar, parallel transmission paths essentially parallel to said ground plane interconnecting both a read differential wire pair and a write differential wire pair to a head slider, respectively;

said first parallel transmission path pair interconnects to a disk drive read interface; and

said second parallel transmission path pair interconnects to a disk drive write interface.

3. (Amended) The apparatus of Claim 1, further comprising:

an analog interface interconnecting said first parallel transmission path and said disk read interface, for at least one of said head arms; and

said analog interface interconnecting said second parallel transmission path and said disk write interface, for at least one of said head arms.

4. (Amended) The apparatus of Claim 1, further comprising:

an analog interface interconnecting said first parallel transmission path and said disk read interface, for each of said head arms; and

said analog interface interconnecting said second parallel transmission path and said disk write interface, for each of said head arms.

9. (Amended) The method of Claim 8,

wherein said voice coil actuator arm is further comprised of a second head arm;  
and

said method is further comprised of the steps of:

said second head arm providing electrical interconnection between a third head slider and a third disk drive read interface and a third disk drive write interface.

10. (Amended) The method of Claim 9,  
wherein said voice coil actuator arm is further comprised of a third head arm; and  
said method is further comprised of the steps of:  
said third head arm providing electrical interconnection between a fourth head slider and a fourth disk drive read interface and a fourth disk drive write interface.

17. (Amended) The apparatus of Claim 16, further comprising:  
a second head arm interconnecting a third head slider, a third disk read interface and a third disk write interface.

18. (Amended) The apparatus of Claim 17, further comprising:  
a third head arm interconnecting a fourth head slider, a fourth disk read interface and a fourth disk write interface.

25. (Amended) The method of Claim 22, further comprising the steps of:  
providing a third differential signal path and a fourth differential signal path as essentially parallel, coplanar traces on said head arm traversing an essentially fixed distance parallel to said ground plane as a third differential trace pair and a fourth differential trace pair;  
providing connectivity to a second head slider for a second read differential wire pair and for a second write differential wire pair via said third and said fourth differential trace pair, respectively;  
providing connection to a second disk drive read interface via said third differential trace pair; and  
providing connection to a second disk drive write interface via said fourth differential trace pair.



26. (Amended)        The method of Claim 22,  
                         wherein a voice coil actuator arm is comprised of said head arm and a second head arm; and  
                         said method is further comprised of the steps of:  
                         manufacturing said second head arm to provide electrical interconnection between a third head slider and a third disk drive read interface and a third disk drive write interface.
27. (Amended)        The method of Claim 26,  
                         wherein said voice coil actuator arm is further comprised of a third head arm; and  
                         said method is further comprised of the steps of:  
                         manufacturing said third head arm to provide electrical interconnection between a fourth head slider and a fourth disk drive read interface and a fourth disk drive write interface.
31. (New)        Said voice coil actuator arm including said head arm, as a product of the process of Claim 24.